Operations Factual

Accident: **Capsizing of U.S. Small Passenger Vessel *Taki-Tooo***
Date: June 14, 2003
Location: Pacific Ocean, near entrance to Tillamook Bay, Oregon
NTSB # : DCA03MM035

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Accident Summary 3
Accident 3
Injuries 13
Damage 13
Personnel Information 13
Vessel Information 15
Critical Profile 15
Coast Guard Inspections 16
Vessel Survey 17
Engine Information 18
Wreckage 18
Waterway Information 20
Operational Information 23
Meteorological Information 24
Other Information 25
Tides and Tidal Currents 25
Waves and Swell 25
Taki-Tooo Chart Plotter 26
Oakland Pilot Data Card 27
Eyewitness Sketches 28

Accident Summary

At about 0605 on the morning of June 14, 2003 [1], the U.S. Charter Fishing Vessel *Taki-Too*o departed the marina at Garibaldi, Oregon with seventeen passengers and two crewmembers on board. The vessel proceeded to an area near the entrance to Tillamook Bay and waited for the opportune sea conditions before making an attempt to depart the inlet. At about 0715 the *Taki-Tooo* departed the inlet and encountered a wave that capsized the vessel. The master and eight passengers died. Two persons were missing and presumed dead. The deckhand and remaining seven passengers washed ashore on the nearby beach and survived.

Accident

At about 0530, June 14, 2003, the master of the charter fishing vessel *Taki-Tooo* left his home and went to the Garibaldi Charters office, operators of the charter fishing vessels *Taki-Tooo*, *Norwester* and *D&D*. The master was not the regularly assigned master but had been requested by passengers that had made arrangements to go charter fishing for the day (See section on Owner).

According to the master's wife, there were two VHF radios in the couple's home as well as a VHF radio in the master's truck. The wife stated that the master made it a point to listen to the radio before leaving the home and while driving to the charter office.

[1] All times are based on Pacific Daylight Time (PDT), which is seven hours earlier than Universal Time.

He would print out weather maps on his personal computer to review forecasts for the bar.

The master and deckhand agreed that due to weather conditions at the bar, they would not be setting crab pots as originally planned. According to the deckhand, it would have been difficult to retrieve the pots and the master told the passengers at the charter company office that the reason the crab pots would not be set was due to the rough bar.

The master and deckhand went to the vessel at the marina and boarded the passengers. The master gave a safety briefing but did not demonstrate the procedure for donning a lifejacket. The deckhand described the master as being happy and was joking on the morning of the accident, which was consistent with the deckhands' perception of the master's personality.

The master assumed control of the vessel from the flying bridge and proceeded towards the entrance to the inlet (see waterway information for description of inlet, bar and observation tower). The *Taki-Tooo* proceeded past the Coast Guard observation tower shortly before 0700. A Coast Guard seaman, hereafter referred to as tower watch 1, had been stationed in the tower since 0445. Another Coast Guard seaman relieved him at about 0700 and he will be referred to as tower watch 2.

The Coast Guard Motor Lifeboat (MLB) 47210 was on scene near the inlet at 0445. The operator of the vessel was a certified coxswain that had been in the Coast Guard for eight years and had been stationed at Tillamook Bay for over five years. It was the duty of the coxswain to make an assessment of the bar conditions based on visual

observations and make a recommendation back to the station. After observing the conditions at the bar, the coxswain transmitted the following bar report back to Station Tillamook; Tips 6-8 sluffing and plunging: All outside areas 8-10 O/S 12 Sloughing[2] and Plunging; Visibility 05 Nautical Miles; Winds East @ 14 Knots.; Recommend Keeping Bar restricted to All. The Senior Duty Officer and Officer of the Day concurred and the bar was restricted to recreational traffic.

Commercial fishing vessels were not under the restriction (See section on waterway). A VHF Broadcast regarding the Bar restriction was transmitted at 0514 on VHF channels 16 and 22A as well as Citizens Band radio Channel 09.

The charter fishing vessel *Oakland Pilot* had arrived near the observation tower at about 0545. According to the master of the commercial fishing vessel *Amanda*, he arrived on scene after the *Oakland Pilot* had already arrived at the inlet but before the charter fishing vessel *Norwester* arrived near the tower at about 0620. The *Amanda* was not recorded on the Coast Guard vessel count sheet, which was maintained by the tower watch. The owner of Garibaldi Charters drove to the north jetty in order to watch the boats depart the inlet. He had arrived at about 0620 and before the *Norwester* had arrived near the tower. He stated that it was not unusual for him to go to the jetty to watch the vessels depart the bar. Another charter fishing vessel, the *D&D,* arrived at the inlet at about the same time that the *Taki-Tooo* arrived. [3] The *Norwester and Oakland Pilot*

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[2] From Coast Guard technical review, correct term should have been sloughing, meaning cast off or shed.

[3] The times that the vessels arrived near the observation tower and inlet were taken from post-accident interviews, the Coast Guard Observation Tower Vessel Count Sheet and in the case of the Oakland Pilot, from trackpoint data retrieved from the vessel's chart plotter.

waited near the jetty tips and backed into the ebbing current. The master of the *Norwester* told Safety Board investigators that he waited for thirty to forty-five minutes before seeing a "window" to cross the bar.

According to the master of the *Amanda*, the *Norwester* immediately took a position on the north side of the bar, just inside from the jetty tip in an area called the soft zone. See Figure___ for comparison of vessels. Tower watch 1 told Safety Board investigators that while he was on watch in the tower, he observed the sea conditions consisting of eight to ten waves in a series with a five to six second break or lull between sets.

Name of Vessel	**Propulsion**	**Horsepower**	**Length**	**Breadth**	**Depth (feet)**
Norwester	Twin-Screw	420	41.8	14.2	6.3
Oakland Pilot	Twin-Screw	730	44.4	15.3	8.6
D & D	Single-Screw	230	32.4	12.2	5.3
Taki- Tooo	Single-Screw	250	32.5	12.1	5.3
Kerri- Linn	Single-Screw	330	29.4	12.3	5.6
Amanda[4]	Single-Screw		23.0		

* All of the vessels were constructed of Fiberglass Reinforced plywood (FRP).

Figure ____. Comparison of charter fishing vessels associated with the accident.

According to tower watch 1, he observed the *Norwester* depart the inlet at about 0645 and continued to monitor the vessel's progress as it proceeded through the bar. The *Norwester* rode over one swell and on the second break, the vessel was stood straight up or at close to a vertical angle pointing upwards. The tower watch continued to maintain

[4] The Amanda was an uninspected commercial fishing vessel.

visual contact with the vessel until it cleared the surf area and was out in calmer seas. The coxswain on the MLB told Safety Board investigators that the *Norwester* "took them really good," referring to the seas. He observed the stern of the vessel "just go way up in the air and come back down."

According to the master of the *Norwester*, after clearing the bar, he contacted the other vessels waiting at the inlet by VHF radiotelephone channel. The transmission was not taped nor monitored by the Coast Guard tower, but the mate on the *Taki-Tooo* stated at the post accident interview with Safety Board investigators that the master of the *Norwester* called back and said that "it wasn't worth it" and that the vessels should wait until the bar had calmed. The master of the *Norwester* also stated in his transmission that the other captains should not tell his mom that he had gone through the bar. A passenger that was standing next to the master of the *D&D* stated in a post accident interview to Safety Board investigators that the *Norwester* master stated over the VHF was "Quote, unquote, It is not worth it." The owner of the charter company was standing on the north jetty and was monitoring the radio traffic with a hand-held VHF radio. He believed he heard the master of the *Norwester* say that it "was not worth it to do it now" and told investigators that he thought the master of the *Norwester* was addressing the master of the *Taki-Tooo*.

One of the passengers on board the *Taki-Tooo* was standing along the foredeck of the vessel and close to the master at the flying bridge controls. The passenger stated to Coast Guard investigators during an interview conducted on the afternoon of the accident that he heard the master of the *Norwester* say over the radio that he had to avoid hitting a

log and that "it wasn't worth it." At the post accident interview with Safety Board investigators, the master of the *Norwester* said that there were "logs all over the tips and stuff."

About five minutes after the *Norwester* cleared the bar, the *Oakland Pilot* proceeded past the jetty tips to cross the bar. The vessel experienced similar conditions to the *Norwester*. One passenger was thrown against a window and his elbow broke the window. (See section on Oakland Pilot's Chart Plotter Data for description of trackline over bar.) The deckhand of the *Taki-Tooo* told Safety Board investigators that the master of the *Oakland Pilot* called back on the VHF radio after clearing the bar and said that he had to dodge a log and that there were "a lot of logs floating out there."

At about 0700, a second Coast Guard seaman reported to the tower to assume the watch. He will be referred to watch 2. According to watch 1, the turnover between the two seamen lasted less than two minutes. Watch 1 informed watch 2 that the surf was pretty rough and that watch 2 had just missed some "cowboy stuff pulled off by the *Norwester* and *Oakland Pilot*." Watch 1 also remarked to watch 2 that the *Norwester* was stood straight up as it proceeded through the bar.

The *D&D* was the next vessel to make the transit through the bar and departed about 0700. According to a passenger that stood next to the master, the vessel was staying on the north side of the channel where the seas were not breaking. The passenger stated that before the vessel departed the inlet, the master was looking for the lull for the vessel to make his run through the bar. Without any verbal warning, the master increased propulsion and according to the passenger, "we just kind of took out, we went straight

west and then we turned north out to the end of the jetty." The vessel went over about two, or three good waves, and the passenger thought that the master was about to turn west again. The passenger saw a log the size of a tree coming in with the next wave, and he thought the master turned back towards the north to maneuver around the log. The vessel continued towards the northwest and took one swell over the bow and continued on its intended route out of the bar area. At the post accident interview with Safety Board investigators, the master had no recollection of logs or debris within the bar area. He recalled a radio conversation between the *Norwester* and *Oakland Pilot* and that referred to debris in the water, yet he did not see any logs until he was clear of the bar in deeper water.

The *Taki-Tooo* was the only remaining charter vessel at the inlet entrance after the *D&D* departed. The master of the *Amanda* did not intend to attempt to cross the bar and remained to watch the *Taki-Tooo* cross the bar. According to the deckhand of the *Taki-Tooo*, the master made about six circles starting near the tower and would edge out towards the jetty tips. The deckhand stated that the vessel never made it to the jetty tips while making the circles to assess the bar conditions. The master would maneuver the vessel from the tower to about three quarters of the way to the jetty and then back around again in a circle to near the tower. While making the circles, the deckhand noticed that as the other vessels departed the inlet, "if they waited until it looked good, you wouldn't get there in time for it to be good, so you had to kind of inch out there while it wasn't good."

The owner of the charter company told Safety Board investigators that on the morning of the accident, he could identify the sets of waves as, " you have got two large waves usually and then five or six smaller ones and then a large one for the sets." He

also stated that the distance between large waves meant that a vessel "wasn't going to allow you to make it all the way out without going over at least one of those bigger ones." The owner repeated what the deckhand had told investigators. The masters had to depart the jaws of the jetty when the seas were not good to be in position at the bar for when the seas were good.

The deckhand joined the master on the flying bridge immediately prior to departing the inlet. According to the deckhand, the vessel departed the inlet, rode over one swell and saw that the waves were getting bigger instead of smaller. According to the deckhand, the master remarked, "he did not want to get into this". The deckhand believed the master put the engines in reverse or astern power so the vessel " didn't go flying off the other end" of the wave. She stated that the boat twisted to the north and the swell was coming from the west. The deckhand stated that the vessel never lost power and she would have known if it had.

The passenger that had been standing on the foredeck had returned to the cabin. He told Coast Guard investigators that the boat was running fine but the master "got into some debris or logs and had to back out of it. He lost power and he powered back up." The third swell was about twenty feet in height and he could "see it coming." He stated that the master turned the vessel north around the jetty for what he referred to as the "third roller" which capsized the vessel. He believed that the master made a "judgement call" in not making another turn and have all passengers don a lifejacket. He never thought the master would turn the vessel to take the swell "broadside."

The master of the *Amanda* stated at the post accident interview that he watched

the *Taki-Tooo* and it didn't look to him "like the vessel was being pushed. It looked to him like the master of the *Taki-Tooo* "just backed off the throttle some, turned and hit his throttle again to go north, you know, to get off of the bar."

Another eyewitness to the capsizing was the owner/master of the charter fishing vessel *Kerri Lin*. The owner/master cancelled his charter for the day due to the sea conditions at the bar. His policy was that once the sea exceeded double digits, meaning ten feet, he would not operate. The owner/operator had gone to breakfast and heard over a hand-held VHF radio some "chatter" between the boats at the bar. He decided to go to the north jetty to watch as the vessels departed the inlet. He arrived as the *D&D* started out through the bar. He told Safety Board investigators that the master of the *D&D* never hurried is departure track and "didn't have any trouble at all" going past the bar.

He continued to watch as the *Taki-Tooo* departed the inlet and saw the vessel go over a ten or twelve foot wave. He believed the master of the *Taki-Tooo* throttled down or reduced speed, which he stated should have allowed the wave to roll underneath the vessel and prevent the vessel from crashing down on the backside of the wave. However, instead, he said the vessel "backed down and it kind of went sideways." He thought the master of the *Taki-Tooo* gave more power to the engines as the vessel rolled up and in the curl of a 12 to 15 foot sea that he described as a "monster". The vessel capsized throwing the passengers standing on the stern of the boat into the sea. One passenger stated that he was thrown into the cabin, but could not explain how it happened.

The Coast Guard tower watch 2 observed the *Taki-Tooo* depart the inlet and followed the track of the vessel by looking through the "big eye" binoculars. He told

Safety Board investigators that he had never seen a vessel pass as close to the northern tip of the jetty as the *Taki-Tooo*. He saw a second swell that was breaking and the force of the swell capsized the vessel. Tower Watch 2 stated that the swell did not break on the *Taki-Tooo*.

The coxswain of the MLB watched the *Taki-Tooo* depart the inlet and observed him pass "really close to the north tip." He lost visual contact of the *Taki-Tooo* and waited until the tower watch told him that the vessel had capsized.

The tower notified the MLB that the *Taki-Tooo* had capsized. The operator of the MLB told safety Board investigators that he waited about one minute before he felt he could get safe passage out across the bar. He could not identify a lull and could only see breakers that were very steep. He described the seas as " really, really choppy and big " and said that the MLB had to travel over a swell he estimated at about 14 feet. He also stated that the swells were breaking and the entire area around the bar was whitewater.

After clearing the inlet, he remembered that he was not qualified to attempt a rescue in the surf. He felt that the *Taki-Tooo* was very close to the rocks and any attempt to approach the capsized vessel would have endangered his vessel. He estimated that he was within 50 to 75 yards from the jetty tip as opposed to the typical 100 yards distance from the jetty.

At 0725 PDT, the Coast Guard's District 13 Rescue Coordination Center (RCC)

received a distress alert from an EPIRB[5] registered to the vessel *Taki-Tooo*. At 0730, the RCC received confirmation from Station Garibaldi that the vessel had capsized with 19 persons in the water. A Coast Guard 47210 rescue boat was reported underway with a second 47210 and helicopter launched.

Injuries

See Survival Factors Factuals.

Damage

The Taki-Tooo had an estimated market value of $60,000 and replacement value of $180,000.[6]

Personnel Information

The master of the *Taki-Tooo* on the day of the accident was the owner of the vessel. He was 66 years old and had lived and operated charter fishing boats in the Tillamook area for 15 years. He was the previous owner of Garibaldi Charters.

The master had operated under a U.S. Coast Guard license since March 1984. See table below. Applicants for the issuance of an original license included proof of

[5] Emergency Position Indicating Radio Beacon.

[6] The values are based on a Septemeber 2002 survey performed by a marine surveyor.

Issue Number	License Held	Issue Date
1	To Operate or Navigate Passenger Carrying Vessels of not more than 50 gross tons upon the Pacific Ocean not more than 50 miles offshore	March 19, 1984
2	Master Near Coastal Steam or Motor Vessels Of Not more than 50 Gross Tons	January 4, 1989
3	Master Near Costal Steam or Motor Vessels of Not more than 50 Gross Tons	January 24, 1994
4	Master Near Coastal Steam or Motor Vessels of Not More than 100 Gross Tons	March 3, 1999

qualifying experience for the appropriate tonnage or horsepower. The application provided by the Coast Guard indicated that the master had 122 eight-hour days in the preceding three years before applying for his original license. The application also indicated that the master had over 700- eight-hour days of experience operating small passenger vessels upon the Pacific Ocean from Tillamook Head, Oregon to Leadbetter Point, Washington. In order to renew his license, the master had to prove that he had one year experience in the previous five years on vessels of the appropriate tonnage or horsepower . [7] According to the records submitted to the Coast Guard, from March 1984 until renewal of his license in March 1999, all of the master's experience was on the *Taki-Tooo* in waters of the Pacific Ocean starting from Tillamook Bay. See the table below for his sea service records.

Vessel/Length	Dates	Sea Service Days
We-O-Sum / 24 feet	1976 to 1981	465
Cat- Meow / 24 feet	1981	84
Taki-Tooo / 32.5 feet	1982 to 1983	193
Taki-Tooo	1984 to 1988	395
Taki-Tooo	1989 to 1993	466
Taki-Tooo	1994 to 1998	551

[7] 46CFR 10.209 (i).

The master was required to have a physical examination in accordance with 46CFR in order to renew his license. His most recent examination was February 17, 1999. The master had been treated for prostate cancer in 1993 and tongue cancer in 1989. The master was on medication for high blood pressure. The examining physician found the master competent to perform the duties to be performed on board a merchant vessel.

The records indicated that the master's vision was corrected to 20/20 and his field of vision was normal.

The 22 year old deckhand was the charter owner's daughter. She had worked as a deckhand for five years and had begun her career working with the master on the *Taki-Tooo*. She had worked with her brother, the master of the *Norwester*, for three summers and returned to the Taki-Tooo the summer of 2003. The trip of the capsizing was the first trip she had made with the particular master that season.

Vessel Information

Critical Profile

Official Number	579874
Hull Number	35-707
Year Built	1977
Registered Length	32.5
Gross Registered Tons	14
Total Persons Allowed on Board	22

The *Taki-Tooo* was a charter fishing boat that was inspected by the Coast Guard to comply with 46CFR Subchapter T. The *Taki-Tooo* was manufactured by Modutech Marine Inc of Tacoma Washington. According to the company sales brochure, the vessel was a 36 foot charter fishing boat with a flying bridge, cabin and open deck on the stern.

The following measurements were taken by Safety Board investigators:

Cabin	7.5 feet long by 8.75 feet wide
Aft Open Deck	18.5 feet long by 12 feet wide
Open Bow	6 feet long by 9 feet wide

The vessel was owned by Davis Fisheries, Inc. and was operated by Garibaldi Charters. According to the U.S. Coast Guard Certificate of Inspection, the vessel was required to be manned with one Coast Guard licensed master and one deckhand. The route permitted was "Pacific Ocean between Point St. George, California, and Angeles Point, Washington, Not more than 100 miles from land."

A Simplified Stability Test, supervised by the Coast Guard, was performed on the vessel on 24 April 1990.[8]

Coast Guard Inspections

The vessel had undergone a Coast Guard drydock inspection November 29, 2001. A complete hull examination was conducted and the only deficiency noted was that the owner had to repair a leak entering forward compartment from kingpost located on main

[8] The Simplified Stability Test, described by pre-1996 changes to the Small Passenger Vessel regulations in 46 CFR 171.030.

deck. The item had to be accomplished before the vessel could carry passengers.

The *Taki-Tooo* had undergone an Annual inspection in March, 2003. Eight deficiencies were noted as follows:

1. Renew the 100 foot life line that connects the weak link to the buoyant apparatus.
2. Renew the lanyard attaching the float light to the buoyant apparatus.
3. Prove proper operation of the fixed fire extinguisher system once re-installed.
4. Prove proper operation of the bilge high water alarm for both the engineroom and steering compartment.
5. Provide guard over battery terminal to protect them from hatch cover.
6. Prove proper operation of the mast head light.
7. Label the bilge manifold to show what compartment they serve.
8. Provide new Rules of the Road Book.

All of the deficiencies were cleared April 23, 2003.

Vessel Survey

All Boats, Ltd. Marine Surveyors conducted a valuation survey on the *Taki-Tooo* in September 2002. The survey was conducted while the vessel was in the water. According to the survey, the vessel's estimated value was $60,000 with an estimated replacement value of $180,000.

The hull, cabin and flying bridge were constructed of fiberglass reinforced plastic (FRP). The decks were built of plywood with FRP cover and wood frames. The bow was raked with single hard chines.

The vessel had a 4-bladed 26" diameter right-handed bronze propeller.

Wheelhouse Electronic and Equipment

1 24 Mile Range Radar
2 VHF Radios
1 Citizen's Band Radio
1 Single Sideband Radio
1 Magnetic Compass
1 Loran C
1 GPS
1 Chart Plotter

According to the owner, the flying bridge also had a Chart plotter, magnetic compass and VHF radio.

Engine Information

The boat was powered by a single diesel engine with reduction gear, shaft to propeller. The engine data was as follows:

Manufacturer John Deere
Model 6076AFM30
Installed 1998
Horsepower per RPM's 300 at 2200

Wreckage

According to passengers on the *Taki-Tooo*, the vessel capsized and made a second complete roll and ended upside down. The flying bridge operating console was missing and not recovered. Deck railings on the bow were bent and knocked loose from their mountings. Safety Board investigators found no evidence of damage to the vessel's hull.

The propeller was examined on scene and found to have suffered damage to its four blades. The propeller was sent to the NTSB laboratory in Washington, D.C. for examination and documentation of damage. The propeller had been stamped on the hub facing aft with the marking "22RH" and the Serial number AX566.measurement. The propeller's four blades curled in the forward direction with the total angle of the curl and the area over which the curl occurred increased in the counter clockwise direction while looking forward.

Safety Board investigators made a post-accident inspection of the vessel with emphasis on the propulsion and steering components. The rudder and rudder post appeared to be solidly mounted and undamaged. The propeller shaft was straight and unremarkable.

The diesel engine was found intact, with no signs of oil leaks or any obvious sign of catastrophic failure. All fuel lines, fittings, and linkages were intact and attached.

The throttle and transmissions control were manipulated at the lower helm station, and they moved the throttle linkage throughout its range. The lower helm station wheel was turned in both directions and turned freely.

Waterway Information

The entrance to Tillamook Bay is located 42 miles south of the Columbia River and is protected by jetties to the north and south. See figure___. The north jetty extends 800 yards offshore with the westernmost section (of about 100 yards) of both jetties submerged. [9] A lighted whistle buoy is located about 1.2 nautical miles from the north jetty in a depth of water that is over 100 feet. The channel within the protected jetty area runs in an east-west direction.

The entire area between the beach and the 20 foot curve is considered the bar area.[10] The bar area extends out .6 mile from the jetty tips to buoy "1". A crescent-shaped or curved area of shoals with depths of less than 30 feet was located between the jetty tips and buoy "1" and was referred to as the middle ground. The area was unpredictable and considered hazardous because it was the area that the incoming seas would tend to break at due to the shallow water. After clearing the north jetty tip, there is a section of deep water between the middle ground and shallow area towards the beach that is referred to as the north hole. A vessel could follow a northwesterly course to follow the channel and narrow stretch of deep water as indicated in figure ___. There was a similar stretch of deep water to the south of the jetty tips that was referred to as the south hole. The water depths in this area are deeper than the surrounding shallow bar.

The water depth decreased slightly until .6 of a mile from the inlet where the 60

[9] Boating in Coastal Water. Pg.20 Published by Oregon State Marine Board Revised June 2001.
[10] A bank or shoal usually at the mouth of a river obstructing the entrance or rendering it difficult.

meter depth contour was located. The area is a patch of shoals within a 30 foot depth contour.

The Army Corps of Engineers is charged by Congress to maintain an 18-foot deep channel over the ocean bar at the entrance of Tillamook Bay. Dredging was last performed in 1976 and annual surveys have indicated that the channel has remained within its authorized depth. "The jetties are pinched which results in the jetties acting like a pinched water hose nozzle to flush sediment out the narrow entrance to deep water."[11] The Corps was scheduled to survey the channel in July 2003 but moved it to the third week of June 2003 to assist in the investigation into the capsizing of the *Taki-Tooo*. The survey showed that the channel was within the 18 foot depth. Any future channel dredging would require funding through Congressional action. [12]

Coast Guard Station Tillamook Bay was a designated Surf Station. The criteria for designating a station as a surf station was based on two components: environment and frequency of surf.

> Environment: Surf stations are designated in areas where surf is greater than eight feet, on a federally mandated navigable bar or entrance, of sufficient water depth to allow the operation of a surf capable boat.
>
> Frequency of Surf: Surf stations are designated in areas where surf greater than eight feet occurs ten per cent or more during a calendar year (36 days) averaged over a minimum period of five years. [13]

International Maritime Dictionary 2nd Edition

[11] www.nwp.usace.army.mil/issues/tillamook/welcome.htm March 24, 2004

[12] www.nwp.usace.army.mil/issues/tillamook/welcome.htm March 24, 2004

[13] U.S. Coast Guard Boat Operations and Training (BOAT) Manual Volume I. COMDINST M16114.32

Tillamook Bay Bar was a regulated boating area[14] that defined boats as any vessels used for non-commercial purposes or operated as an unispected passenger vessel subject to the requirements of 46 CFR chapter I, subchapter C.[15] The term "other unsafe condition" included boats operated in a regulated boating area when the following conditions existed:

> (1) The wave height within the Regulated Boating area was four feet or greater; or
> (2) The wave height within the Regulated Boating Area was equal to or greater than the wave height determined by the formula L/10+F=W where
>
> L equaled overall length of boat in feet, F was the minimum freeboard when measured from the lowest point along the upper strake edge to the surface of the water. W was the maximum wave height in feet to the nearest highest whole number. [16]

The Coast Guard had established rough bar advisory signs that were diamond shaped, painted white with an international orange border and with the words "Rough Bar" in black letters. The sign is equipped with two quick flashing yellow lights that will be activated when seas exceed four feet in height and are considered hazardous for small boats.[17] The signs were located on the north side of the channel at the Coast Guard station and on the observation tower.

Vessel movement at the Tillamook Bar was monitored by a Coast Guard seaman stationed in an observation tower located on the north side of the inlet about nine hundred

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[14] 33CFR 177.08 (f).
[15] 33 CFR 177.03 Definitions.
[16] 33 CFR 177.07 (f).

yards east from the north jetty tip. The tower was manned during daylight periods from about one half hour before sunrise and remained manned when the hazardous bar light was lit. The tower was about 68 feet high with VHF radio, hand held binoculars and tripod mounted "big eyes" binoculars. The "big eyes" magnification were 25 X 150 mm lens.

The 47' motor lifeboat is designed as a first response rescue resource in high seas, surf & heavy weather environments. They are built to withstand the most severe conditions at sea and are capable of effecting a rescue at sea even under the most difficult circumstances. They are self-bailing, self-righting, almost unsinkable, and have a long cruising radius for their size. It is the replacement for the aging 44' MLB fleet. There are (presently) 81 operational, being added to monthly. The total (to be delivered over 5 years) will be about 200.

Operational Information

The master of the *Taki-Tooo,* and the master's wife had owned Garibaldi Charters and the *Taki-Tooo* and the *D&D* for approximately 15 years. In March 2001, the master and his wife had sold Garibaldi Charters to another charter vessel operator; however, they retained ownership of the two vessels. A term of the sale stipulated that the *Taki-Tooo* and *D&D* would be leased to and operated by Garibaldi Charters.

Garbibaldi Charters would provide whalewatching trips, occasional weddings,

[17] U.S. Coast Pilot 7- pg. 408.

scattering of ashes and fishing. The season went from March until October and was dictated by the weather. According to the owner of Garibaldi Charter, the weather did not permit regular trips from October until March.

The owner of Garibaldi Charters was the usual master on board the *Taki-Tooo*. However, a charter group that had made reservations to fish on board had requested that the owner be the master on the day of the accident.

Garibaldi Charters owned the *Norwester*, the first vessel to depart the inlet on the day of the accident.

Meteorological Information

The National Weather Service Portland, Oregon at 1645 June 13, 2003 issued the following forecast for coastal waters for southern Washington and northern Oregon Coast: A weak PAC front will brush across the Northern waters Saturday. High Pres will rebuild in the N on Sun. The forecast called for small craft advisory for hazardous seas for the same evening and the following conditions:"S wind 20 knots. Wind waves four feet.West swell 10 feet at 11 seconds.. The forecast predicted 12 foot swells for Sat and 14 second period."[18]

According to the meteorologist-in-Charge at the Portland, Oregon National Weather Service Office, the Small Craft Advisory for Hazardous Seas was issued at 1645, June 13, 2004, Pacific Daylight Time.

[18] Forecasts were for ocean conditions.

A National Weather Service anemometer was mounted on the observation tower and wind directions and speeds were recorded. At 0700 to 0730 the wind direction was from a southeasterly direction at about ten knots.

The master of the *Amanda* told Safety Board investigators that there was a swell from the west, another smaller swell from the northwest and a swell from the southwest. At certain times the three swells would join and form one large swell.

Other Information

Tides and Tidal Currents

The soundings at Tillamook Bay Inlet and Bar that are represented on NOAA Chart 18558 are for the depths of water at Mean Lower Low Water (MLLW). There was a full moon at 0417 Pacific Daylight Time (PDT) on June 14, 2003. [19] According to Tide Tables that were provided by local merchants as well as on line tide software www.tides.com, there was a negative tide of 2.1 feet on the morning of the accident.

The tide was near the end of the ebb tide[20] at the time of the accident, which was 0721 for Tillamook Beaches and bar.

Waves and Swell

[19] aa.usno.navy.mil/cgi-bin/aa_pap.pl.
[20] Ebb tide is when the flow of water is toward the sea.

Wind is the principal factor that causes waves on the earth. The resulting waves caused by the prevailing winds are referred to as sea.[21] Swells on the other hand are wind-generated waves that have continued on out of the area of generation.[22] As the waves or swells enter shallow water, the friction of the bottom will tend to slow down the water particles near the bottom while the upper water particles continue at the faster velocity. The difference in speed between the upper and lower wave will cause the wave to steepen and then break.[23] The breakers fall into three classes. A spilling breaker breaks gradually and over a considerable distance. A plunging breaker tends to curl over and break in a single crash. A surging break peaks up, but surges on the beach without spilling or plunging.

The Oregon State Marine Board, in describing hazards crossing the Tillamook Bar, states,

> *One of the greatest risks a boater can encounter is getting caught in a shallow river entrance to the Pacific - the bar – when a swift ebb current is meeting incoming westerly waves. Such conditions result in the two opposing forces meeting to pile up water and waves that break with tremendous force.* [24]

Taki-Tooo Chart Plotter

The *Taki-Tooo's* chart plotter was retrieved and sent to the manufacturer in an attempt to retrieve the vessel's track data. The evaluation showed the unit to have been

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[21] Bowditch American Practical Navigator
[22] Weather for the Mariner, Kotsch pg.133
[23] Ibid. pg. 133
[24] www.marinebd.osmb.state.or.us/Coastal Waters/Safety1.htm May 17, 2005

completely waterlogged with all components damaged, consistent with the unit having been submerged. The salt water intrusion, along with the length of time the unit sat prior to receipt at by the manufacturer had completely damaged all internal components, thus rendering the data irretrievable.

Oakland Pilot Data Card

The fishing vessel *Oakland Pilot* had a Garmin Chart Plotter with Global Positioning System (GPS) input. The unit had the function of downloading recent data on to a data saver card. Safety Board investigators downloaded the data on to the card and sent the card for extraction to the manufacturers headquarters. The information was plotted on the nautical chart for the inlet. See appendix____ for the positions, times, course and speeds of the *Oakland Pilot* for the date of the accident.

The data showed that the first recorded track at 12:29:19 PM (UTC), which would have been 0529 local on June 14, 2003. The data indicated that the vessel was off the jetty tips at about 0545 and maintained station using various courses and speeds. At about 0656, the Oakland Pilot increased speed to over 12 knots and proceeded past the jetty tips on a magnetic course of 278˚. Within seconds of clearing the jetty, the vessel turned towards the north-northwest to an area that was east of the north hole. The vessel's track remained east of the north hole until clearing the bar in deeper water. See figure___.

Eyewitness Sketches

During the on-scene investigation, Safety Board investigators requested eyewitnesses to sketch the tracks of the four vessels that departed the inlet on the morning of the accident. The sketches were done by the owner of Garibaldi Charter, the owner/master of the *Kerri Lin*, and Watch tower 2.

The owner of Garibaldi charter positioned the five vessels within the jetty tips with the *Norwester* and *Oakland Pilot* at the farthest point to the west of the inlet. The *Taki-To*oo and *D&D* remained further in. The routes of the vessels were sketched showing the *D&D* taking the track furthest to the west, with the *Norwester* and *Oakland Pilot* closer to the jetty on a similar track. The *Taki-Too's* track was the closest to the north jetty tip.

The watch tower 2 was walking up the tower steps to relieve watch tower 1 when the *Oakland Pilot* departed the inlet. He did not see the *Norwester* cross the bar. His sketch indicated the *Oakland Pilot* as taking the western most track with the *D&D* more to the east, followed by the *Taki-Tooo* as closest to the north jetty tip. The sketch of the track of the *Oakland Pilot* indicated that the vessel remained east of the north hole, which was consistent with the chart plotter information.

The sketch provided by the owner/master of the *Kerri-Lin* indicated the trackline of the *Taki-Tooo* as closer to the north tip of the jetty than the *D&D*. He did not witness the *Norwester* or *Oakland Pilot* depart the inlet.